# DRIVER MODULE V2 (3U) CROSS-TALK TEST PROCEDURE

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File Location: CO-OP PC (PPD 1075)\\ E:\Cdms\Driver V2\Cross-talk testing\
Test Procedure\DrV2_Crs_tlk_test_proc.doc

This document should be used along with the "Driver V2 Users Manual" to test and/or troubleshoot the 3U Squid Module.

## I. INTRODUCTION:

This portion of the test procedure for a Driver V2 board is intended to determine the amount of cross-talk between amplifier channels on a typical Driver V2 board. A board that is being built and tested should be able to pass this test and meet all other specifications given to it before it can officially be "stamped" as a Driver V2 module.

These tests were performed using an HP 3589A Network Analyzer. The data was first stored on a floppy disk in a "LIF" (Logical Interchange Format), the conventional format used by HP. These files were then transferred to DOS (Disk Operating System) format using the "SDF Utilities" disks included with the HP3589A, and then on to an "SDF" (Standard Data Format). This SDF file was then viewed with the utilities package and the data dumped into an ASCII text file. This file could then be opened and graphed with Microsoft Excel as "Cross-Talk Voltage (dB) vs. Frequency". This procedure will be described in detail below, but it should be noted that in the future, if a large number of files needs to be transferred from an HP3589 to a PC, that the network RS-232 port on the back of the machine should be utilized instead. There is another set of utilities available for this transfer that will decrease the time and effort required, as well as eliminate the need to use floppy disks at all.

## II. TEST EQUIPMENT REQUIRED:

1. Unix Computer with RACK.PL –I DRIVER.RACK software
2. GPIB Interface
3. 3U Controller Card Version "D". Board # ISR-D.x
4. 3U Subrack, #3U-1.x
5. 3U Extender Card for subrack, #XB3-1.x
6. CDMS Power Supply, #PS-1.x
7. HP 3589A Spectrum/Network Analyzer
8. 2 co-axial clip leads with adapters for the HP 3589A
9. 3 ½" LOW DENSITY floppy disk, formatted on the HP 3589A under the "**Disk Utilities Menu**" (Tape over the hole of a high density disk)
10. 3 ½" Floppy disk, PC format
11. SDF Utilities disks (3), Rev B.02.01, included with the HP 3589A
12. A computer that is running just DOS; NOT DOS running on top of any windows operating systems (95, NT, etc…)

## III. TEST PROCEDURE:

**TEST SETUP:**

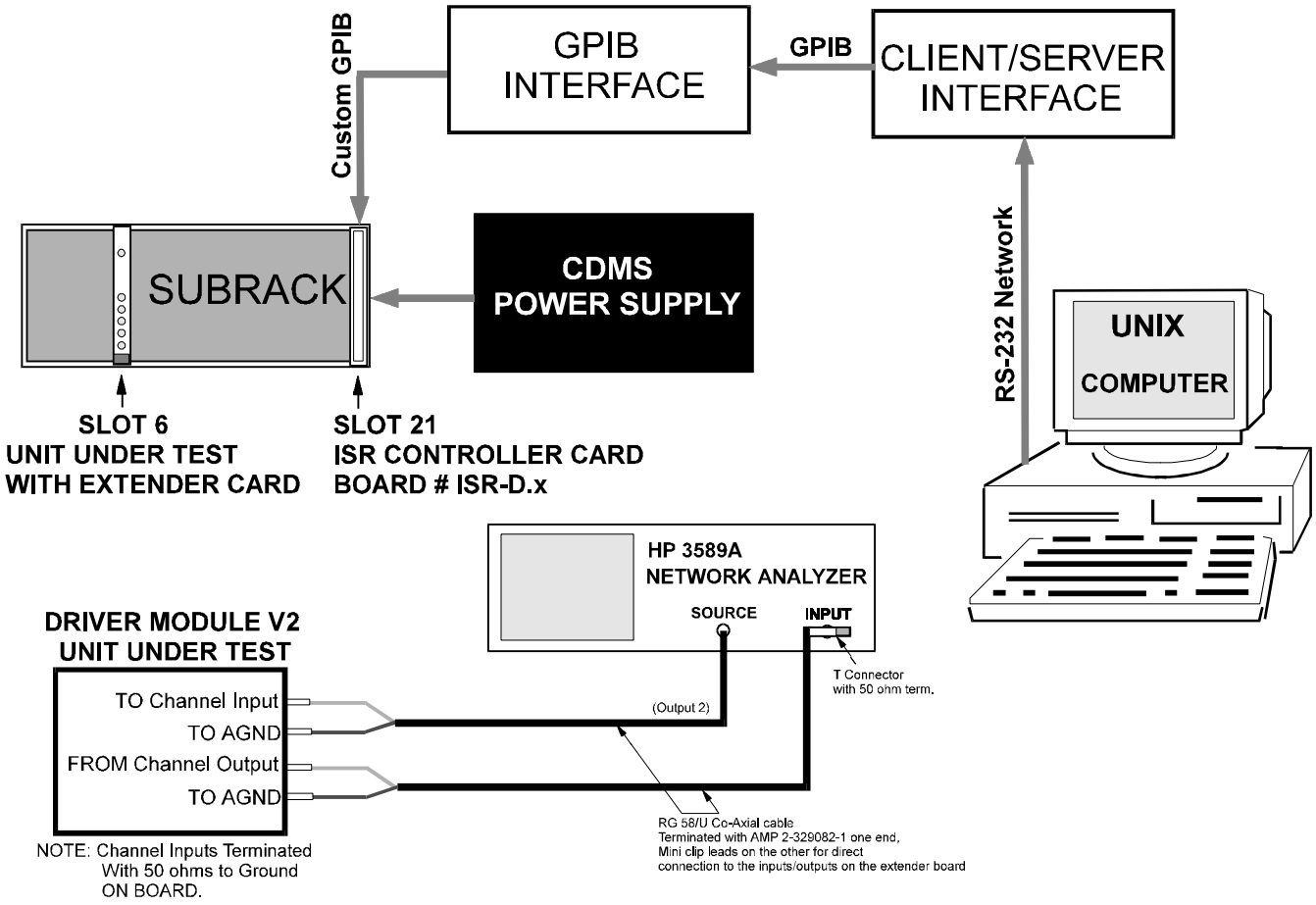


Figure 1: Test Setup

1) Insert the Driver V2 module to be tested into slot 6 with an extender card and power up. All the gains should come up set to 1 and all DC offsets set to 0v. Warm up the unit under test for 15 minutes (or longer) prior to starting this test.
2) Setup the HP 3589A Spectrum/Network Analyzer as follows:

| | |
|---|---|
| Turn Source | "**ON**" |
| Source Amplitude: | **0 dB** |
| Select | "**50 ohm OUTPUT 2**" |
| | |
| Sweep time: | **~2 seconds** |
| Start frequency: | **0 Hz** |
| Stop frequency: | **1 MHz** |

3) Normalize the network analyzer as follows:
(Eliminates unwanted effects from the signal leads, interference etc…)

a) Short the source and input leads together at the board to be tested
b) Select "**SWEPT NETWORK MODE**"
c) Press "**TRACE DATA**" and switch to "**NETWORK FUNCTION**"
d) Push "**MEASURE CALIBRATE**"
e) Press "**NORM XMSN (THRU)**"

4) Place the "Source" leads on the INPUT of the channel to be tested.

5) Place the "Input" leads on each of the OUTPUTs of the other 5 channels in succession, while consecutively saving the traces to the disk for each channel.

6) Before saving however, Press "Autoscale" and make sure the resulting trace is vertically centered on the screen by adjusting the min and max Y-axis values accordingly. (The convention we have used so far is a "**TOP REF**" of –35 dB, with 5 dB/div, resulting in a minimum of –85 dB at the bottom of the display.

7) Save the active trace to the LOW DENSITY, FORMATED, 3 ½" floppy disk using the "**SAVE/ RECALL**" menu.

The filename convention that has been set up is as follows:

"C" For Cross-talk
# Board number
# Input Channel
# Output channel

For example, for board #2, driving channel 0 while observing channel 2 will be denoted as "**C202**".

8) Repeat for all channel combinations.

9) Now convert the files on the disk, to PC format as follows:

a) Install the SDF Utilities (3 disks, Rev B.02.01), included with the HP 3589A on the hard drive of a PC operating through DOS (NOT DOS running on top of any Windows operating systems. This works on the lab PC by switching to "Microsoft Windows" during start-up. Files needed are located in "c:\driver" folder.)

b) Run the program "LIF LS" located on Disk 1 using the following format:

C:\<path>\LIF LS a:

This should list all the LIF files on the floppy. If it doesn't, there is something wrong.

c) Now copy the LIF files to DOS files using the "LIF CP" program with the following format:

C:\<path>\LIF CP a: c:\<path>*.89

NOTE: It is imperative that the location of the new *.89 files is in the same directory as the files from disk 1 of the SDF utilities.

All the files should then copy over to the hard drive in DOS format with ".89" extensions.

d) Remove the LIF formatted disk and replace it with a PC formatted disk in drive a:

e) Now convert the files from "89" to "SDF" format using the program "89toSDF" with the following syntax:

C:\<path>\89TOSDF c:\<path>\filename.89 a:\filename.sdf

Note: Each file must be converted INDIVIDUALLY in this manner. This is because of the way the SDF utilities program works. What it does is create the destination file first, then converts the file over into it. Thus it doesn't know what to do if you use the *.sdf command, because it needs a filename, and **"*"** is not a valid filename. You could

possibly write a DOS batch file to do this conversion if you wanted to…….. (Also, you can't write over existing files either with this program.)

f) Now take the new disk with the SDF files on it to your PC and view them with the SDF utilities program (after installing the utilities on your PC) on disk 2 called "Viewdata". After running this program, change the file type under the menu heading "**File**" to "**SDF**". Next "**Read**" a file from the floppy disk by typing the correct path: "**a:\Cxxx.sdf**". Save this into trace "**A**". Now go into "**Display**", then "**Show Trace**". This will display the graph as you saw it on the network analyzer. Now you need to dump the data to an ASCII file type by typing the letter "**d**". It will prompt you for the filename, so type "**a:\Cxxx.txt**". Now this ASCII text file can be opened with Microsoft Excel, using a comma as a column delimiter, which is designated in the opening windows. Before continuing, save the data with "**Save As**", and change the file type to "**Excel 97 Workbook**". This data can now be graphed and plotted using Excel.